

Remarks

Reconsideration of this Application is respectfully requested.

Upon entry of the foregoing reply, claims 18, 19, 21-34, 36, and 37 are pending in the application, with claims 18, 26, and 32 being the independent claims. Claims 18, 19, 21, 32, 34, and 37 are sought to be amended to improve their form. Claims 20 and 35 are sought to be canceled without prejudice to or disclaimer of the subject matter therein. These changes are believed to introduce no new matter, and their entry is respectfully requested.

Based on the following remarks, Applicants respectfully request that the Examiner reconsider all outstanding objections and rejections and that they be withdrawn.

Allowable Subject Matter

Applicants acknowledge with appreciation the Examiner's indication that claims 27-31 would be allowable if rewritten in independent form including all of the limitations of their base claim and any intervening claims.

Rejections under 35 U.S.C. §103

Natura in view of Brahmbhatt

In the Office Action, claims 18-21 were rejected under 35 U.S.C. §103(a) as being unpatentable over Nauta, U.S. Patent No. 5,117,205 (Nauta) in view of Brahmbhatt, U.S. Patent No. 4,442,481 (Brahmbhatt). Applicants respectfully traverse this rejection.

In order to establish a *prima facie* case of obviousness, "there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings." MPEP §2142. Instead of providing evidence of a suggestion or motivation to combine the references in support of the rejection, the Examiner provides the supporting rationale that "native MOSFETs are art-recognized equivalent[s] to enhancement mode MOSFETs." (Office Action, p. 3). Applicants respectfully disagree with the Examiner's supporting rationale.

Native MOSFET devices are not functionally equivalent to enhancement mode MOSFETs. A native MOS device does not require additional doping to create the channel region. (Specification, p. 4, line 33 - p. 5, line 1). As a result, the threshold voltage, V_t , of a native MOS device is very low. (Specification, p. 5, line 2; stating that V_t of the native MOS device is 0.041 volts). Enhancement and depletion mode devices (referred to herein as conventional devices) require doping to alter the conductivity of the channel region. As a result, these devices have a higher threshold voltage and are susceptible to the "body effect." That is, in these devices, the threshold voltage varies with the source to bulk voltage (VSB). The variation in threshold voltages causes a similar variation in the transconductance of the device. (Specification, p. 4, lines 25-26). In native devices, because of the low threshold voltage, the transconductance of the device does not vary much with VSB. (Specification, p. 5, lines 3-6).

Applicants also described additional differences between a native device and a conventional device. For example, the control voltage of a native device has a greater dynamic range than a conventional device. (Specification, p. 5, lines 13-19). In

addition, a native device has a lower transconductance gain with respect to the transconductance voltage than a conventional device. Thus, a native device and a conventional device have significant differences in operational characteristics and function.

It was the limitations of conventional MOS devices that Applicant sought to remedy by the claimed invention. The Specification points out the limitations of conventional devices in the following passages:

A problem with the use of the known transconductance cell lies in the adverse effects of source-bulk voltage (VSB) on MOS transistors used in the transconductance cell. Variations in VSB due to bulk (chip) stray voltages can adversely affect transconductance.

(Specification, p. 2, lines 15-17).

Referring to Equation 1, it is clear that a source of degradation to GM is via the threshold voltage V_t . It is prudent, therefore to examine V_t more closely ... It is clear from this equation that any injection of noise between the transistor source and the semiconductor bulk will cause a variation in V_t and hence GM. This VSB can easily arise if the source and bulk are not tied down at exactly the same potential. Forcing VSB to be zero throughout the filter can be very difficult to do and an alternative approach is presented herein.

(Specification, p. 4, lines 17-29). Thus, the use of conventional MOS devices causes a degradation in transconductance which Applicant's invention sought to remedy. Where an element creates the "very problem" which an Applicant sought to remedy by the claimed invention, the element cannot be considered "functionally equivalent" to the claimed invention. (*See In re Scott*, 323 F.2d 1016, 1020 (CCPA 1963)).

Furthermore, no suggestion or motivation to combine the references to achieve Applicants' invention is explicitly present in Nauta or Brahmbhatt. In addition, no

suggestion or motivation to combine the references to achieve Applicants' invention is implicitly present in Nauta or Brahmbhatt. The test for "an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art." *In re Kotzab*, 217 F.3d 1365, 1370 (Fed. Cir. 2000).

Applicants' claimed invention, Nauta and Brahmbhatt address different problems. Nauta is directed to improving filter performance by providing an electrically controllable oscillator circuit and an electrically controllable filter arrangement. (Nauta, Abstract). Brahmbhatt is concerned with a low power decoder circuit. Brahmbhatt suggests the substitution of natives devices for depletion mode devices because "variations in the manufacturing process will sometimes cause a depletion mode transistor to have a deeper channel than desired. Depending upon the particular values of the gate, source, and substrate voltages, such a depletion mode transistor may not completely block effective conduction even though the gate to source voltage is lower than the threshold voltage." (Brahmbhatt, col. 9, lines 15-28). Thus, Brahmbhatt is directed to insuring that effective current is completely blocked between a word line and a voltage supply in a low power decoder circuit.

As described above, Applicants' claimed invention is directed to the degradation in transconductance caused by the variations in VSB in conventional devices. Applicants' claimed invention provides a solution for this degradation and provides an improved transconductance cell for use in a system on a chip to reduce the adverse effects of variations of VSB.

In *Ruiz v. A.B. Chance Co.*, the Federal Circuit found a motivation to combine references to arrive at the claimed invention in the "nature of the problem to be solved" because each reference was directed "to precisely the same problem of underpinning slumping foundations." *Ruiz v. A.B. Chance Co.*, 357 F.3d 1270, 1276 (Fed. Cir. 2004). Such identity of addressed problems is not present in Nauta and Brahmbhatt.

Based on the foregoing, Applicants submit that the nature of the problems being solved by Nauta and Brahmbhatt would not have suggested or motivated a person of skill in the art to combine Nauta with Brahmbhatt to achieve Applicants' claimed invention. Thus, no suggestion or motivation to combine the references is implicitly present in Nauta or Brahmbhatt.

Furthermore, Applicants note that identification of each individual claimed element in multiple references is insufficient to establish a *prima facie* case of obviousness without some objective reason to combine the teachings of the references.

In re Kotzab, 217 F.3d at 1370. In addition, "[b]road conclusory statements standing along are not 'evidence'." *Id.* Applicants assert that the conclusory statement of the Office Action (cited above) does not provide sufficient objective evidence of a suggestion of the desirability of doing what Applicants have claimed. M.P.E.P § 2143 provides guidance to Examiners in meeting this burden:

The initial burden is on the examiner to provide some suggestion of the desirability of doing what the inventor has done. "To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references." *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985).

Applicants assert that such objective evidence of a suggestion or motivation has not been provided. Applicants also note "it is impermissible to use the claimed invention as an instruction manual or 'template' to piece together the teachings of the prior art so that the claimed invention is rendered obvious . . ." *In re Fritch*, 972 F.2d 1260 (Fed. Cir. 1992). Thus, Applicants respectfully request that objective evidence of a suggestion be provided, presenting a convincing line of reasoning, or that the claims be passed to allowance.

For at least these reasons, independent claim 18 is patentable over Nauta and Brahmbhatt. Furthermore, for at least these reasons, and further in view of their own features, claims 19 and 21 which depend from claim 18 are patentable over Nauta and Brahmbhatt, alone or in combination. Reconsideration and withdrawal of this ground of rejection is therefore respectfully requested.

Nauta, Brahmbhatt, and Chen

Claims 22-26 and 32-37 were rejected under 35 U.S.C. §103(a) as being unpatentable over Nauta in view of Brahmbhatt in view of Chen, U.S. Patent No. 5,463,352 (Chen). Applicants respectfully traverse this rejection.

Claims 22-25 depend from claim 18. Chen does not overcome all of the deficiencies of Nauta and Brahmbhatt relative to claim 18, described above. For at least these reasons and further in view of their own features, claims 22-25 are patentable over the combination of Nauta, Brahmbhatt, and Chen. Reconsideration and withdrawal of the ground of rejection is therefore respectfully requested.

In the rejection of independent claim 32, the Examiner states that "Nauta and Brahmbhatt are shown to teach all the limitations of the claim with the exception of the

phase locked loop comprising of a reference signal, a phase/frequency detector, a charge pump, and a loop filter." (Office Action, p. 4). In addition to a phase/frequency detector and a charge pump, independent claim 32 recites "a voltage controlled oscillator ... comprising: a first gm cell; a second gm cell" and "a first filter ... having a third gm cell, wherein the first gm cell, the second gm cell, and the third gm cell each comprise a variable resistance, the variable resistance comprising a first native MOS device." Independent claim 26 also recites "wherein the first variable resistance is included in a first gm cell in the voltage controlled oscillator, and the first variable resistance comprises a first native MOS device." As described above, no suggestion or motivation exists to combine Nauta and Brahmbhatt to achieve these limitations. Chen does not overcome all of the deficiencies of Nauta and Brahmbhatt described above for these limitations.

For at least these reasons, independent claims 26 and 32 are patentable over the combination of Nauta, Brahmbhatt, and Chen. Furthermore, for at least these reasons, and further in view of their own features, claims 33, 34, 36, and 37 which depend from claim 32 are patentable over Nauta, Brahmbhatt, and Chen, alone or in combination. Reconsideration and withdrawal of this ground of rejection is therefore respectfully requested.

Conclusion

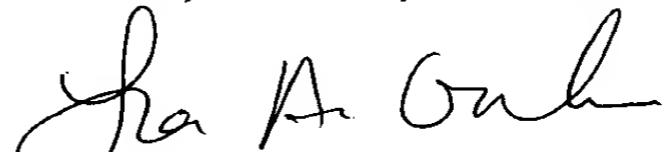
All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider all presently outstanding objections and rejections and that they be

withdrawn. Applicant believes that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment and Reply is respectfully requested.

Respectfully submitted,

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